TRD Status

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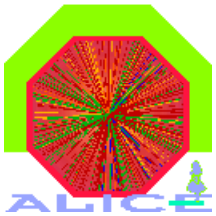


Offline Week, April, 2008

Outline

- Reconstruction $\rightarrow$ Alexandru
- QA $\rightarrow$ Sylwester
- Shuttle DAs + Preprocessor $\rightarrow$ Raphaelle (Alexandru)

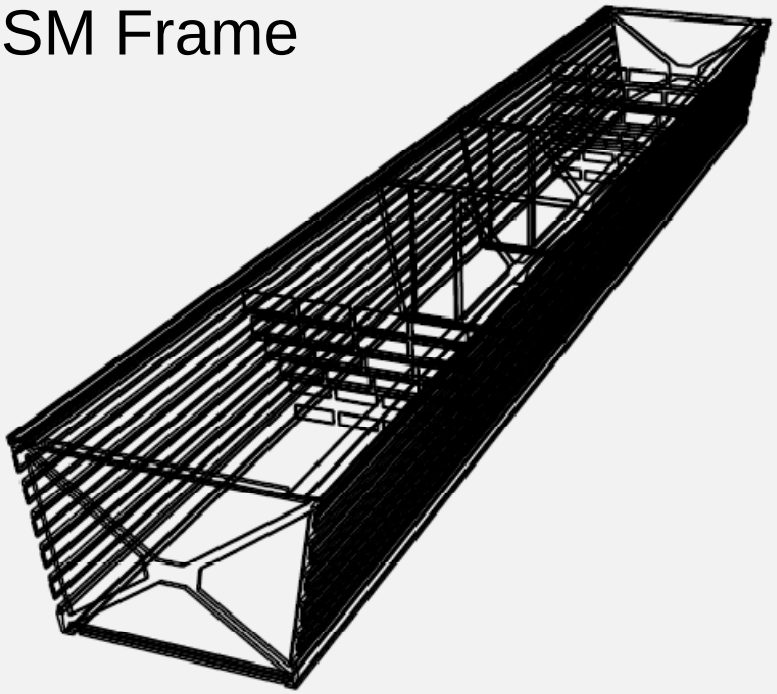
- Geometry + Alignment
- FEE simulation + raw data
- DCS DA + FXS
- HLT monitoring

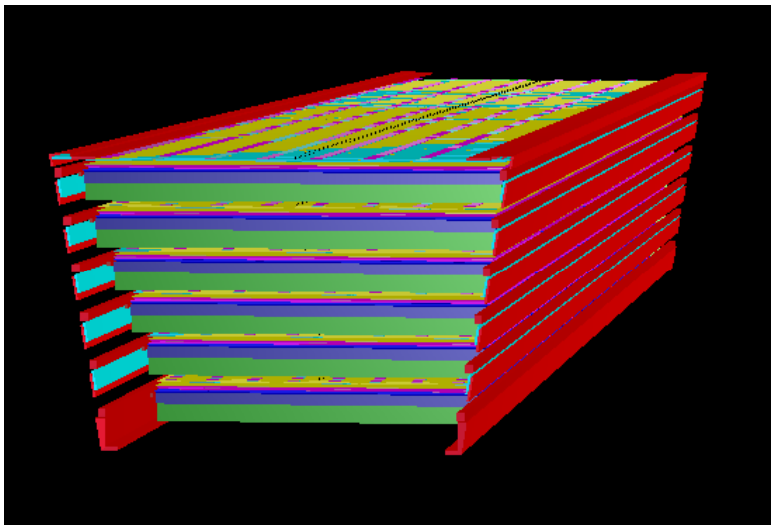
Geometry

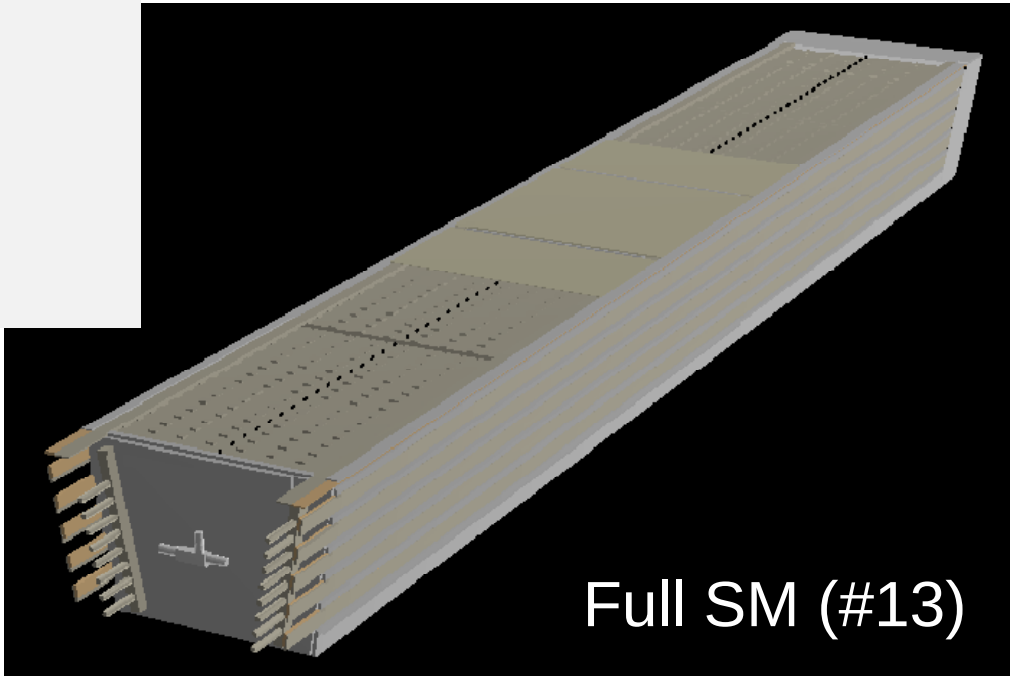
- Holes in front of 3 PHOS modules
  - Sectors 13, 14, 15 w/o middle TRD stack
- Carbon cover inserts
  - All: inner cover
  - In front of PHOS (sectors 11 -15): both covers
- Additional services outside acceptance
  - Cooling manifolds, electronics, etc.

Geometry

SM Frame







Material

- Weight: 1586kg (full SM)
  - Reality: 1650kg
  - But: TRD mother volume too small!
    - Length of TRD incl. services: 7700mm
    - TRD mother volume: 7520mm
  - Request add. TRD mother volumes in back- and babyframe
  - Allows additional material for services (task #2249)

- Material budget (averaged over $0.0 < \eta < 0.12$, 14° in φ)
  - Before: $\langle X/X_0 \rangle = 25.7\%$
  - 1 carbon insert (sector #0): $\langle X/X_0 \rangle = 24.5\%$
  - 2 carbon inserts (sector #12): $\langle X/X_0 \rangle = 23.7\%$
  - Region w/ hole (sector # 14): $\langle X/X_0 \rangle = 2.0\%$
  - Cross check of material budget with test beam data ongoing

Alignment

- `AliSurveyObj` introduced to TRD code (Dariusz Miskowiec)

- Clearance around alignable volumes (task #2220)
  - Needed revision of `AliFRAMEv2`
  - Survey: 2904 – 3683mm $\leftrightarrow$ AliRoot: 2911 – 3690mm
  - No margins for mis-alignment

- Updated version of `AliFRAMEv2` (A. Morsch)
  - TRD position now ok
  - Accomodates mis-alignment w/o overlaps (Dariusz)

    Chambers: $\Delta r\phi = \pm 15$mm, $\Delta r = \pm 13$mm, $\Delta z = \pm 20$mm
    Supermodules: $\Delta r\phi \approx \pm 20$mm, $\Delta r \approx \pm 20$mm, $\Delta z = \pm 6$mm

Digitizer Update

- `AliTRDdigitizer` restructured
  - Compatibility with zero suppression
  - Reduce memory consumption
    - Sort hits before conversion to detector signals
    - Memory needed only for one chamber at a time
  - Faster and better structured code

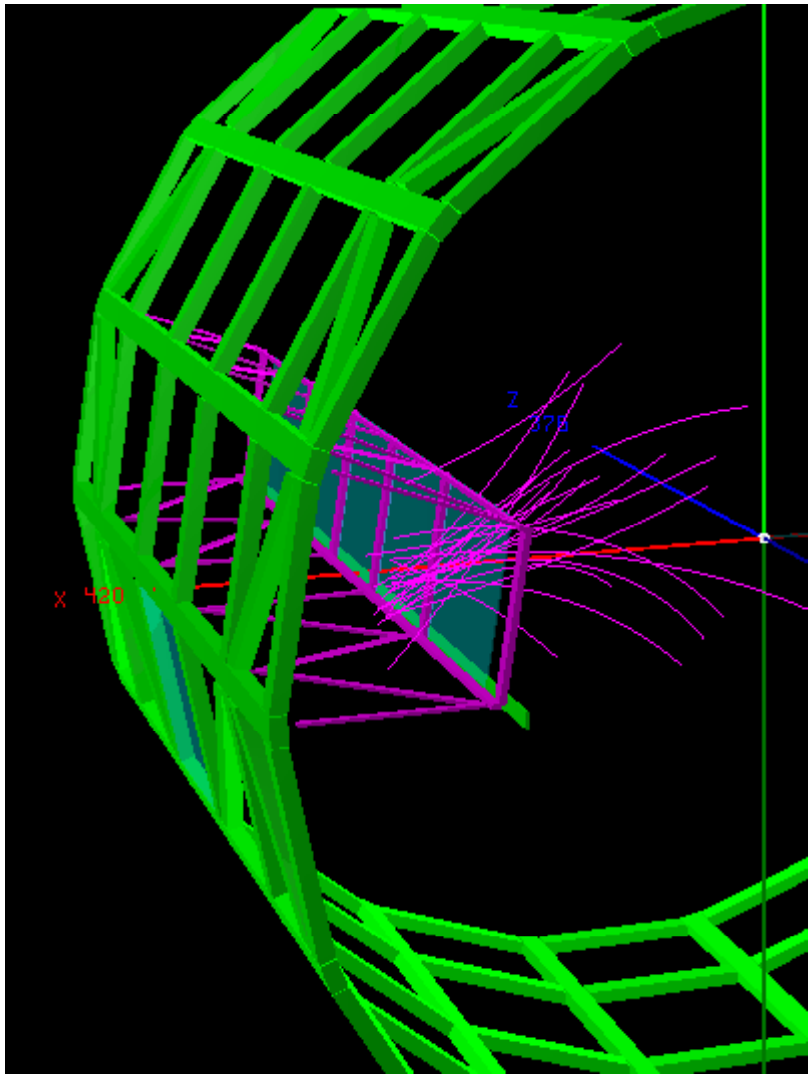
- Open Issue: Zero suppression scheme
  - Currently ZS is applied during conversion digits $\rightarrow$ raw data `AliTRDrawData`, `AliTRDmcmSim`
  - Problem: Large digits file size !
  - Temporary solution: Re-introduce threshold in digitizer. However, not fully compatible with ZS procedure
  - Planned: Move ZS to digitizer (possible, but complicated) (task #2250)

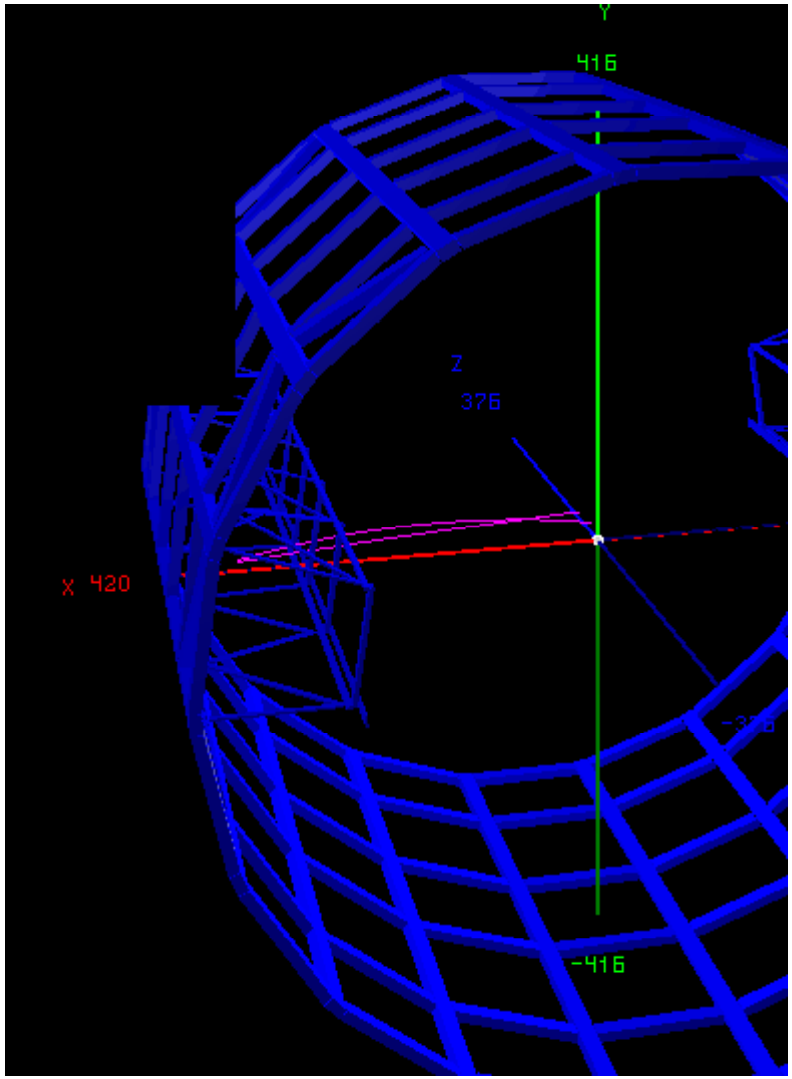
Raw data

- Raw data decoding of cosmics data running
  - `AliTRDrawStreamTB`
  - Has to deal with data corruption, present in inital cosmics data
  - Many parameters being tuned at hardware side
    - Filters, baseline, etc.
  - Provides diagnostic tools for raw data debugging
  - Code in SVN continously updated accordingly (MinJung Kweon)

- Ongoing: Adapt raw data simulation to latest changes in raw data format (task #2251)
  - Simulated raw data read via `AliTRDrawStreamV2`
  - Will be obsolete asap

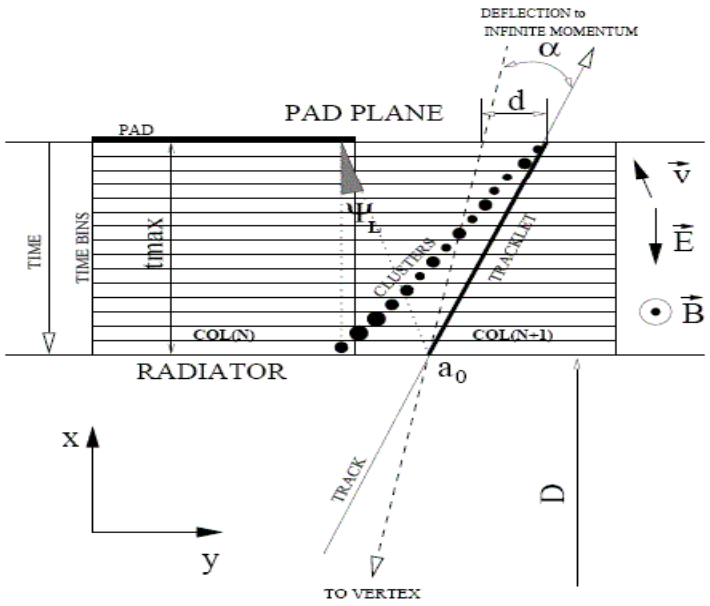
Reconstructed TRD Cosmics Events





FEE Simulation + Trigger

- New simulation of online tracklets (Clemens Haltebourg)
  - Implementation of real hardware algorithm (TRAP-chip) (`AliTRDmcmSim`, `AliTRDtrapAlu`)
  - To be added to raw data stream (as in real raw data)
  - Needed for L1 trigger efficiency studies
  - Next: online PID



- Simulation of online global tracking unit (GTU) (Jochen Klein)
  - Algorithm as implemented in FPGAs
  - Code available, needs to be interfaced to tracklet simulation

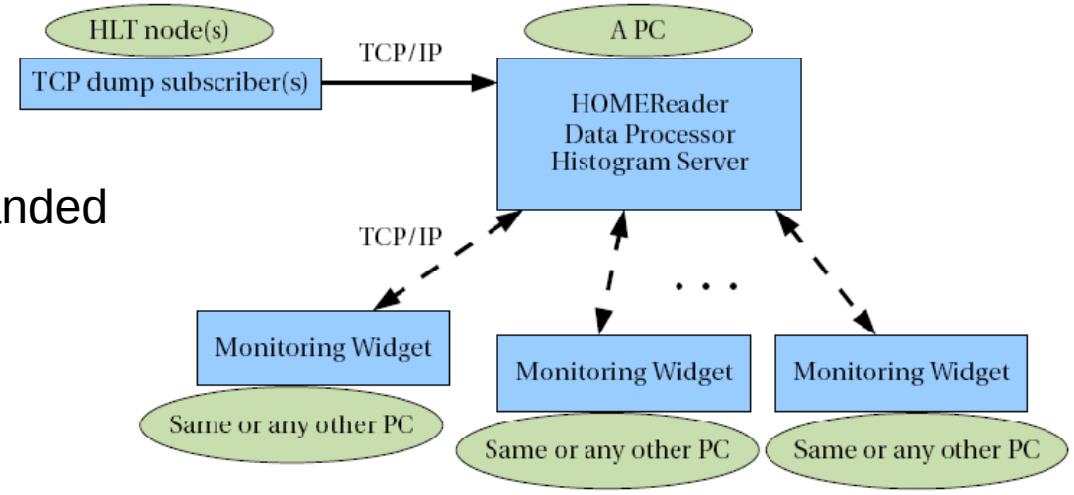
SHUTTLE Preprocessor

- Open issue in DCS DA + FXS:
  - Collect FEE configuration and pretrigger information
  - To be passed to SHUTTLE via FXS
- Definition of input file format and content from hardware side was missing so far
- To be implemented in the next weeks (task #2252)

Monitoring in HLT

- TRD monitoring on HLT (Mateusz)
  - Already been used with test beam data
  - Monitors raw data/digits, clusters, tracks, calibration

- Provides online monitoring solution for TRD
  - Very flexible
  - Will be further expanded and tested during next cosmics runs



- Development being continued in Frankfurt

Screen Shot from Test Beam Data